



THE MICROBIOME, DIET AND HEALTH: TOWARD A SCIENCE AND INNOVATION AGENDA

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The report builds on an OECD workshop organised in May 2016 entitled, "*The Microbiome, Diet and Health: Assessing the Gaps in Science and Innovation.*" Hosted in Brussels by the Belgian Delegation to the BNCT

An explosion of interest

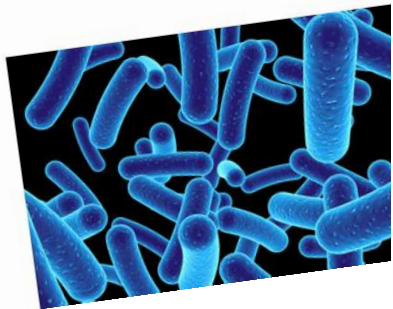
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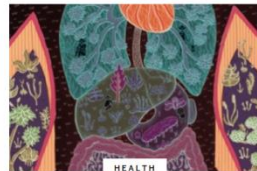
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Innovations in the Microbiome

Revelations about microbes in the gut are shaking the foundations of medicine and nutrition

February 17, 2015



Microbes in the Gut Are Essential to Our Well-Being



Among Trillions of Microbes in the Gut, a Few Are Special



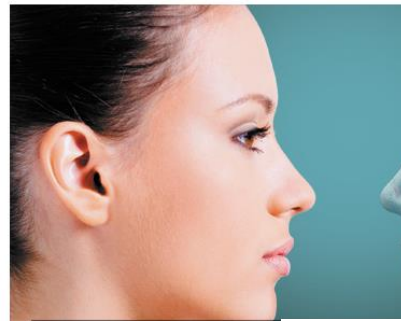
Mental Health May Depend on Creatures in the Gut

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SPECIAL



HUMAN MICROBIOTA

The human body is colonized by a vast community of microbes. The link between these microbes and human health is the focus of current research initiatives, and new insights are emerging in this special collection.

Credit: Joana Ricou / Steven H. Lee /

- Current research in *Nature*
- Related publications in *Nature Methods*
- Related publications in *PLoS journals*



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Change Your Microbiome, Change Yourself

Human microbiome — also known as the "other human genome" — shows that the microbes in your gut could hold the keys to new treatments for conditions ranging from obesity and Crohn's disease to allergies and asthma.

BY KENDALL K. MORGAN
IMAGES COURTESY NIAID

Think you're only human, you'd be wrong

Genome Medicine

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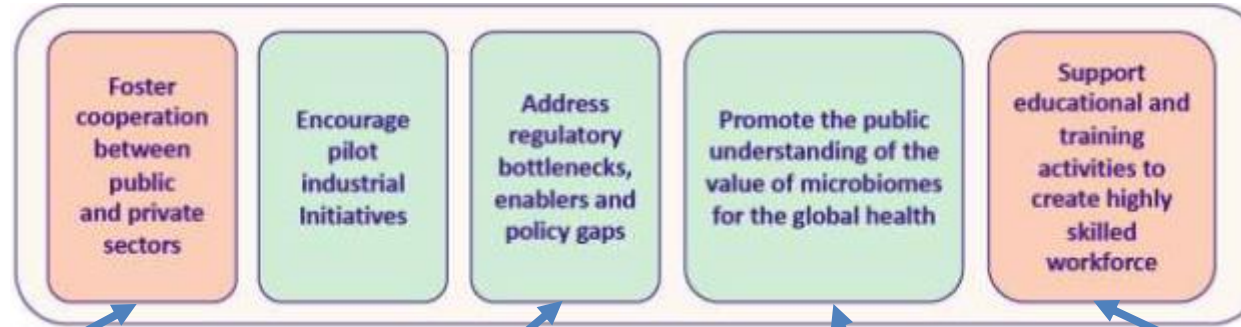


Human Immunology
Microbiome in Health

September 27-29, 2015 - Montréal, Canada



Alignment with the Implementation Action Plan for the Italian Microbiome Initiative



“At a minimum, public or private research funds should be spent in such a way that complementary information is generated across the public and private sector.”

“Classifications need to converge and common standards and endpoints have to be introduced as an easier approach to opening up some of the regulatory barriers.”

“Public engagement in research projects is strongly indicative of the huge public interest in developments in this field.”

“There is a need for new technology development, engineering, computer modelling and bioinformatics. The future workforce and scientists should be trained to combine these skills so that the field can grow and mature.”



Science policy

- **International networking of research**, together with structural funding for transcontinental microbiome research programmes...
- ...there is a need to **further connect** databases and information sources
- ...new international consortia should **move beyond microorganisms found in humans** and link the different microbiome research communities:
 - plant;
 - environmental;
 - animal, and;
 - marine research.
- Large consortia should **not be funded to the exclusion of smaller...**
- ...microbiome science will require deeper understanding of:
 - the host-microbiome nexus;
 - what constitutes a healthy microbiome



Enabling translational science

- There is a need for **guidance and improvement in regulatory**-targeted clinical programming and research
- **Standard protocols** are required for clinical design, marker validation and statistical interpretation
- Existing standardisation activities could be deepened and made **more international**...
- ...but should remain flexible enough to **encourage innovative approaches**
- Better characterisation of a healthy gut will be important for establishing disease biomarkers



Public-private collaboration

- Partnerships between **public and private partners** (food and pharmaceutical) could lead to more rapid advances
- There are known challenges for **data sharing** in such partnerships, where negotiations can founder on **issues of data ownership**
- There is more leeway for **precompetitive activities** among industrial partners and academia
- ...public or private research funds should be spent in such a way to **prevent duplication** of data

BUT

- ...this requires of course **good conditions for accessing data**



Regulatory frameworks

- ...evaluating the **health claims of new food products and new dietary approaches** in certain countries could be improved and made more transparent
- **International harmonisation of regulatory terminology** may be desirable
- ...food and drug regulatory frameworks could be better matched to handle foods making health claims, by:
 - **harmonising the terminology** used in the various regulations;
 - agreeing on **how health claims should be analysed**;
 - designing regulatory frameworks that respond properly to new products
 - **post-marketing surveillance** ...to increase the evidence base of certain products



Skills, communication and the public

- The **future workforce** and scientists should be trained to combine:
 - ...new technology development;
 - engineering;
 - computer modelling and;
 - bioinformatics
- Information needs to be provided to **consumers and citizens** in a clear and understandable way
- Ongoing **citizen science initiatives** ...should help enable societal dialogue and communication
- ...but the quality of data must be scrutinised carefully